CLAIMS

What is claimed is:

1. A method for separating nucleic acids comprising electrophoresing a sample applied to a gel electrophoresis matrix in a capillary, wherein during electrophoresis, the temperature of the matrix is cycled at least two times between a high and low temperature.

2. The method of Claim 1, wherein the nucleic acids to be separated are DNA fragments comprising one or more polymorphic sites.

3. The method of Claim 2, wherein allelic variants at the one or more polymorphic sites are separated.

4. The method of Claim 1, wherein the temperature is initially at a high temperature and the first cycle is from a high temperature to a low temperature.

5. The method of Claim 1, wherein the high temperature and/or low temperature is different during successive cycles.

6. The method of Claim 1, wherein the temperature is cycled from about 2 to 60 times.

7. The method of Claim 4, wherein the temperature is cycled about 20 times.

8. The method of Claim 1, wherein the high temperature is about 3 °C higher than the low temperature.

9. The method of Claim 1, wherein the temperature is between about 2 °C and about 15 °C higher than the lower temperature.

10. The method of Claim 1, wherein the higher temperature is between about 3 °C and about 10 °C higher than the lower temperature.

11. The method of Claim 1, wherein the high temperature is less than about 80 °C.

12. The method of Claim 1, wherein the low temperature is about 40 °C.

13. The method of Claim 1, wherein the high temperature is between 50 °C and 75 °C.

14. The method of Claim 1, wherein the low temperature is between 40 °C and 50 °C.

15. The method of Claim 1, further comprising detecting dsDNA after electrophoresis.

16. The method of Claim 13, wherein, after the desired number of temperature cycles have been completed, the temperature of the gel matrix is such that DNA remains double-stranded.

17. The method of Claim 1, wherein the temperature oscillations are ramped to provide optimal separation of the alleles.

18. A method for estimating allele frequency comprising:

electrophoresing a sample applied to a capillary gel electrophoresis matrix, wherein during electrophoresis, the temperature of the matrix is cycled at least two times, wherein one cycle is from a high temperature to a low temperature or from a low temperature to a high temperature, thereby separating DNA molecules in the sample; and

quantifying the variant sequences of the separated DNA molecules

thereby providing an estimate of the allele frequency for each variant DNA molecule.

19. The method of Claim 18, further comprising detecting dsDNA after electrophoresis.

20. The method of Claim 19, wherein, after the desired number of temperature cycles have been completed, the temperature of the gel matrix is such that DNA remains double-stranded.

21. A method for detecting a microhaplotype comprising separating DNA fragments comprising a sequence comprising two or more polymorphic sites of the microhaplotype, wherein the fragments are separated by capillary electrophoresis performed with two or more temperature oscillations between a high and a low temperature.

22. The method of Claim 21, wherein the temperature oscillations are ramped to provide optimal separation of the microhaplotype.